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15. Supplementary Notes

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16. Abstract (MAXIMUM 200 WORDS)

This report identifies a simplified method of crew size evaluation that can complement the relatively complex crew size evaluation method (CSEM). The simplified crew size evaluation method (S-CSEM) uses lookup tables that were generated via CSEM analyses and a task-based description of operating conditions to eliminate complex calculations, provide flexibility, and link operating conditions to the number of crew needed for vessel operation. Thus, S-CSEM is a simple and practical tool for crew size evaluation.

This report is one of two reports on the use of CSEM to evaluate crew needs under different operational scenarios. The lookup tables in this report were generated by an in-depth analysis reported in, "The Use of the Crew Size Evaluation Method to Examine the Effect of Operational Factors on Crew Needs," CG-D-12-00. That report contains a detailed description of the analyses, the data sets used to perform the analyses, and criteria which can be applied in the evaluation of sufficient crew.

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Executive Summary

This report describes a concept demonstration of a simplified method of crew size evaluation that can complement the relatively complex Crew Size Evaluation Method (CSEM). The Simplified Crew Size Evaluation Method (S-CSEM) uses lookup tables that were generated via CSEM analyses and a task-based description of operating conditions to eliminate complex calculations, provide flexibility, and link operating conditions to the crew complement. Combining lookup tables with shipboard tasks makes S-CSEM a simple and practical tool for crew size evaluation.

S-CSEM matches operating conditions to the crew complement using lookup tables. Lookup tables use rows and columns to show how two variables, such as the port call frequency and the level of shore-based maintenance, affect a third variable, the crew needed to operate the vessel. These tables provide a consistent and understandable estimate of crew needs.

S-CSEM uses a three-step process to identify the crew complement. Step 1 summarizes the relevant operating conditions. Step 2 uses lookup tables to identify combinations of operating conditions that are relevant to estimating crew needs. Work Distribution Summary tables (developed via CSEM simulation analyses) are provided to show the influence of the ship's operating conditions on shipboard tasks and crew work hours. These tables make explicit how changes in operating conditions (compared to a baseline condition) affect crew task activity and, thus, crew needs. Step 3 uses a lookup table to link the combinations of crew-relevant operating conditions to the different crew complements. Based on these three steps, S-CSEM provides a simple procedure that can extend guidelines from the *Marine Safety Manual* with results of task-based analyses from CSEM to develop practical estimates of the crew complement needed to operate a vessel.

As technology and economic pressures change the nature of shipboard operations, a task-based approach to estimating the needed crew will become more prevalent. With S-CSEM, each change in operating conditions can be traced to shipboard functions and then to a recommended crew complement. By linking crewing to shipboard functions, S-CSEM provides a simple, yet powerful, task-based approach for crew size evaluation. For this concept demonstration,

S-CSEM lookup tables were developed for two operating variables: port call frequency, and shoreside maintenance support. As additional analyses are done with CSEM, S-CSEM can support a wider range of operating conditions. This provides the flexibility that is required to meet the needs of a changing industry.

This report is one of two reports on the use of CSEM to evaluate crew needs under different operational scenarios. The lookup tables in this report were generated by an in-depth analysis reported in, "The Use Of the Crew Size Evaluation Method to Examine the Effect of Operational Factors on Crew Needs," CG-D-12-00. That report contains a detailed description of the analyses, the data sets used to perform the analyses, and criteria which can be applied in the evaluation of sufficient crew.